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1 Routine/Function Prologues

1.0.1 retagrlw.F90 (Source File: retagrlw.F90)

Opens, reads, interpolates and overlays LW radiation forcing.

TIME1 = most recent past data

TIME2 = most recent future data

1. Load AGRMET 3 level cloud amount (converted from RTNEPH)
2. Convert 2 m forcing specific humidity to vapor pressure
3. Use AGRMET subroutine longwv() to calculate LW DOWN. Arguments are:
cloud amount [%], 2 m temperature [K], and 2 m vapor pressure [Pa]

REVISION HISTORY:

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28 Oct 1999: Brian Cosgrove; Initial code
11 Apr 2000: Brian Cosgrove; changed code to use Forcing Mask (With inland
              water filled in). Deleted unused variables.
20 Jun 2000: Brian Cosgrove; changed code so that it uses LDAS%UDEF and
              not a hard-wired undefined value of -999.9 and -999.0
25 Jun 2001: Urszula Jambor; Modified for AGRMET data use in GLDAS.
25 Oct 2001: Jesse Meng; Modified for AGRMET LW scheme implementation
04 May 2004: James Geiger; Added opendap support through lis_openfileMod;
              Corrected order cloud layer reading. Cloud
              layers are now stored low, middle, high.

```

INTERFACE:

```
subroutine retagrlw ( order, yr, mo, da, hr, ferror, flag )
```

USES:

```

use lisdrv_module, only : lis, grid
use obsradforcing_module, only : oblwdatal,oblwdata2
use agrmetdomain_module, only : agrmetdrv
use lis_openfileMod
implicit none

```

ARGUMENTS:

```

integer :: yr, mo, da, hr
integer :: order          !retrieve data for time1 or time2
integer :: ferror         !0=no radiation data found
                           !1=found observational data

```

CONTENTS:

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!-----!
! If using AGRMET data, open, read in and interpolate AGRMET files
!   to appropriate GLDAS resolution;

```

```
! If error reading file, or data completely missing, ferror=0;
!-----
ferror = 0
do c = 1, lis%d%ngrid
    if ( order == 1 ) then
        oblwdx1(c) = lis%d%undef
    else if ( order == 2 ) then
        oblwdx2(c) = lis%d%undef
    end if
end do

if ( flag == 1 ) then
!-----
! 1. Generate AGRMET cloud filenames
! Load 3 layers cldamt data
!-----

write(cyr, '(I4.4)') yr
write(cmo, '(I2.2)') mo
write(cda, '(I2.2)') da
write(chr, '(I2.2)') hr

nameSH = trim(agrmtdrv%agrmtdir)//'/CloudAGR//cyr//cmo// &
    '/cldamt_//cyr//cmo//cda//chr
print*, 'Reading AGRMET file : ',nameSH
call lis_open_file(11, file=nameSH, status='old',access='direct',&
    recl=3456000, script='getagmet_lw.pl')
read(11, rec=1,iostat=readerrN) pdata1L
read(11, rec=2,iostat=readerrN) pdata1M
read(11, rec=3,iostat=readerrN) pdata1H
close(11)
if ((openerrN+readerrN) > 0) then
    ferror = 0
    print*, 'AGRMET file problem: ',nameSH
else
    ferror = 1
endif
call interp_agrmet_lw( pdata1H,cldamtH, ferror )
call interp_agrmet_lw( pdata1M,cldamtM, ferror )
call interp_agrmet_lw(pdata1L,cldamtL, ferror )
if ( ferror == 0 ) then
    call lis_log_msg('ERR: retagrlw -- ferror == 0')
    return
endif
!-----
! If AGRMET cloud data is not undefined, set ferror=1
!-----
fvalid = 0
```

```

do c=1, lis%d%ngrid
    if (cldamtH(c) >= 0.0) fvalid = 1
    if (cldamtM(c) >= 0.0) fvalid = 1
    if (cldamtL(c) >= 0.0) fvalid = 1
end do
if (fvalid == 0) then
    call lis_log_msg('ERR: retagrlw -- fvalid == 0')
    return
endif
do c=1,lis%d%ngrid
    rldown = 0.
    tair = grid(c)%forcing(1)
!-----
! 2. CONVERT 2 METER SPECIFIC HUMIDITY TO VAPOR PRESSURE
!-----
    vaporP = grid(c)%forcing(2) * grid(c)%forcing(7) / &
        ( 0.622 + grid(c)%forcing(2) * (1-0.622) )
!-----
! If tair, vaporP, and ALL 3 AGRMET LAYERS cldamt are defined,
! calculate rldown; transfer to proper output array
!-----
    fvalid = 1
    if (tair.LT. 0.0) fvalid = 0
    if (vaporP.LT. 0.0) fvalid = 0
    if (cldamtH(c) .LT. 0.0) fvalid = 0
    if (cldamtM(c) .LT. 0.0) fvalid = 0
    if (cldamtL(c) .LT. 0.0) fvalid = 0

    if (fvalid == 1) then
        cldamt1d(1) = cldamtL(c)
        cldamt1d(2) = cldamtM(c)
        cldamt1d(3) = cldamtH(c)
!-----
! 3. Calculate lw down
!-----
    call agrlwdn( tair, vaporP, cldamt1d, rldown )
    if (order == 1) then
        oblwdatal(c) = rldown
    else if (order == 2) then
        oblwdatad(c) = rldown
    end if
    else
        if (order == 1) then
            oblwdatal(c) = lis%d%udef
        else if (order == 2) then
            oblwdatad(c) = lis%d%udef
        end if
    end if
end if

```

```
    end do
end if
return
```